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OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

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THE JOURNAL

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THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

VOL. 33 NOVEMBER 1911 NUMBER 11

THE ANNUAL MEETING

The Society is again looking forward to its Annual Meeting which will as usual be held in the Engineering Societies Building, New York, in December, opening on Tuesday the 5th, and closing on Friday the 8th.

Some noteworthy papers have been secured by the Committee on Meetings and the professional program will shortly be announced. An important feature this year will be contributions by three of the first sub-committees appointed by the Committee on Meetings, those on Textiles, Cement Manufacture and Machine Shop Practice. One session is to be devoted to Foundry Practice, another to Steam Boiler Performance. The Gas Power Section will as usual have a session, at which Oil Engines, at present a subject of so much importance, will be discussed.

The entertainment features which are so prominent a part of annual gatherings, will be in the hands of the Committee on Meetings in New York, who have always provided so successfully for the pleasure and comfort of the members and their guests. The principal events will be the President's reception on Tuesday evening in the rooms of the Society, George J. Foran acting as chairman of the sub-committee in charge; and the annual reunion of the membership of New York in honor of the newly-elected officers and visiting members, at the Hotel Astor on Thursday evening, F. A. Scheffler having been appointed chairman of the sub-committee in charge of that occasion. Luncheon will be served as usual on Wednesday and Thursday during the convention. While the program as announced is similar to that

of last year, many interesting features will be found which, in combination with the finish of detail for which the meetings have already become noted, ought to make the entire convention one of profit and enjoyment. There will be a number of excursions, prominent among which will be an inspection of the S. S. Olympic. The Society will be the guests on that occasion of the White Star Line. The Olympic will be in port on her first trip since her recent accident, and the repairs are being hastened in order that the membership may not be disappointed in its plans to visit this great floating palace. There will also be trips to the Brooklyn Navy Yard, the Sims Magneto Company in Bloomfield, N. J., the Bush Terminal Buildings in Brooklyn, E. W. Bliss Company, Brooklyn, and the Hotel Astor. In general the Committee will be glad to arrange special visits on request if sufficient notice be given.

The welcoming of the visiting ladies will again be in charge of the ladies of New York who have organized a committee to plan for trips and entertainment of various descriptions, Mrs. Jesse M. Smith acting as chairman. The headquarters of the committee will be in the rooms of the Society on the eleventh floor. The ladies of the Society and their guests will be received by the Ladies' Committee on Wednesday afternoon at four o'clock.

RAILROAD TRANSPORTATION

Arrangements for hotel, transportation and Pullman car accommodations should be made personally.

For members and guests attending the Annual Meeting in New York, December 5–8, 1911, the special rate of a fare and three-fifths for the round trip, on the certificate plan, is granted when the regular fare is 75 cents and upwards, from territory specified below.

a Buy your ticket at full fare for the going journey, between December 1 and 7 inclusive, and get a certificate, *not a receipt*, securing these at least half an hour before the departure of the train.

b Certificates are not kept at all stations. If your station agent has not certificates and through tickets, he will tell you the nearest station where they can be obtained. Buy a local ticket to that point and there get your certificate and through ticket.

c On arrival at the meeting, present your certificate to the registration desk at the Headquarters. A fee of 25 cents will be collected for each certificate validated. No certificate can be validated after December 8.

d An agent of the Trunk Line Association will validate certificates, Dec. 6, 7, 8. No refund of fare will be made on account of failure to have certificate validated.

e One-hundred certificates and round trip tickets must be presented for validation before the plan is operative. This makes it important to show the return portion of your round trip ticket at Headquarters.

f If certificate is validated, a return ticket to destination can be purchased, up to Dec. 12, on the same route over which the purchaser came, at three-fifths the rate.

This special rate is granted only for the following:

Trunk Line Association:

All of New York east of a line running from Buffalo to Salamanca, all of Pennsylvania east of the Ohio River, all of New Jersey, Delaware and Maryland; also that portion of West Virginia and Virginia north of a line running through Huntington, Charleston, White Sulphur Springs, Charlottesville, and Washington, D. C.

CURRENT AFFAIRS OF THE SOCIETY

STUDENT BRANCHES

The movement to affiliate student engineering societies had its inception in the fall of 1908, when the Stevens Engineering Society applied for affiliation and was accorded privileges by the Council. A month later the Cornell Student Branch was formed. In the three years intervening the number has grown to twenty-four, with a total membership of more than half a thousand.

According to the basis adopted by the Council in December 1908, these student branches, while maintaining their autonomy and independence, are offered many of the privileges of the Society. The Journal is sent as a subscription to all affiliates, and all other publications of the Society are supplied to the students at members' rates. Each organization holds independent meetings, monthly or bi-monthly, and reports of these are published in The Journal from time to time. Members of the Society frequently address the branch meetings, and the Secretary has personally visited many of them in order to convey the Society's greetings and to express its cordial interest. Many graduates are now among the Society's Junior members and promise to become prominent in its service. Branch

meetings offer to the students practical opportunities for public speaking, for the presentation and discussion of papers, and for a widening of acquaintanceship likely to be of value professionally. The training received, modelled as each branch is on the lines of the larger organization of which it is a part, thus fits the students to undertake, immediately after leaving college, activities which they would otherwise have to forego.

TECHNICAL SEARCHES

The Society has for years put the contents of its library within the reach of every member, no matter how far situated from headquarters, through technical searches. An especially able staff is maintained and that the service is being appreciated is evidenced by recent requests for data upon the following subjects, among many which might be named: steel belts, combustion of coal dust, efficiency tests of pumps for waterworks, bearings, ball and roller, making of brass tubes, care of belting, size of drums for wire rope, design of hooks for cranes, automatic stops, fire hose pressure, high-speed tools, drying lumber in kilns, permanent molds, manufacture and properties of phosphor bronze, comparative value of various methods of power transmission, engineering standards and specifications, smoke abatement, composition and heat treatment of steel, steam meters, high-pressure turbo-compressors, tap drills for various metals, manufacture of seamless steel tubes, and shop costs. In some instances typewritten copies of complete articles have been furnished as well as translations. We are equipped to make translations from any language.

This is an especially valuable side of the work being done by the library and ought to appeal to members who lack the time to make such searches for themselves. Unless the work is extensive no charge is made and in any event the cost of copying or translation is gaged by the time required and is slight in proportion to its value. Members are invited to make use of the library in this way.

STANDARDIZATION OF FLANGES

An important work of the committees has been the formulation of standards and the effort has always been to secure results which would be mutually acceptable to the designers, manufacturers, and users of the apparatus to which the standards applied. The Society does not adopt standards in the usual sense, the procedure

being instead for a committee authorized by the Council to investigate and report, and at a suitable time the report is brought up for discussion at a meeting of the Society. When issued in its final form it is simply ordered printed by the Council.

In 1894 a committee of the Society coöperated with one from the National Association of Master Steam and Hot Water Fitters in the preparation of standards for pipe flanges for low-pressure work. These have been very largely adopted by manufacturers, although certain manufacturers' standards have also been employed.

Recently the matter has been taken up again by the National Association of Master Steam and Hot Water Fitters, and a committee of The American Society of Mechanical Engineers, H. G. Stott, chairman, has coöperated with them in preparing a report, a preliminary draft of which was submitted for discussion at the Spring Meeting at Pittsburgh and later was favorably considered by the Master Steam and Hot Water Fitters. This report is both for standard weight and extra heavy flanged fittings, and in the larger sizes, that is 9 inches and above, it represents the investigation and work contributed in a large measure by our own committee. For these sizes the flanges were drawn on paper, full size, and the bolt holes laid out and tested to insure that there would be no trouble in using wrenches or through other interferences. The effort was especially made to secure ample strength in the bolts, inasmuch as in some of the flanges as now used, the bolts are stressed beyond what is considered by our committee to be a safe working strength.

Another step in the preparation of the schedule has been the holding of a joint meeting of these two committees and representatives of manufacturers of pipes and fittings. Obviously the manufacturers' interests are very great, not only because of the large stock of fittings which must be regularly carried and which become obsolete if radical changes in design were made, but because the equipment in the way of patterns, flasks, etc., is an enormous item, as well as the carrying of stock of both styles for old and new work. The efforts of the Society may always be depended upon to be directed toward the securing of results mutually advantageous to the manufacturer and user, in so far as this is practicable without sacrificing the obvious responsibility of the Society to advocate only what can be considered sound engineering practice.

THE ANNUAL MEETING

The Annual Meeting to take place in December, beginning on Tuesday evening the 5th, and ending on Friday the 8th, is the 32d

in the history of the Society. In 1905 when the Engineering Societies Building was in immediate prospect, the interest in the Society and its activities very naturally increased, and the attendance of members at the Annual Meeting of that year was 50 per cent larger than it had been at any previous meeting. Since that time the attendance has continued to be large, averaging more than 700 members, thus affording an unusual opportunity for engineers to meet others in the profession from different sections of the country.

The preparation of the program of these meetings which is in the hands of the Committee on Meetings, involves a great amount of painstaking work, extending over a long period of time. The meeting this year will be notable because it represents the beginning of a new era in the meetings of the Society, wherein contributions will be made from widely different fields of engineering by groups of men who are specialists in the subjects brought up for discussion. This is the result of the plan of the Committee on Meetings, which has also received the enthusiastic approval of the Council, to organize subcommittees of specialists who will assist in securing papers, present annual reports of the state of the art, and otherwise bring to the attention of members in other fields the important engineering problems that are to be solved. They will in return receive the benefit of discussion by the entire membership who may have had similar problems in their own particular fields.

It is no small problem, moreover, to arrange the entertainment program for these Annual Meetings, even in a city with the resources of New York. The Committee on Meetings in New York took this matter in hand early for the coming meeting and have arranged excursions to points so far as possible not before visited by the Society as a body, and they have also introduced new features which should add to the pleasure of those who have been regular attendants of these meetings.

CALVIN W. RICE, *Secretary.*

COMING MEETINGS

NEW YORK MEETING, NOVEMBER 14

On account of the wide interest in the subject of Welding, Autogenous, and Electric, the Committee on Meetings of the Society in New York has arranged for its presentation at the monthly meeting on November 14 in the Engineering Societies Building. The material already in hand is replete with valuable information concerning the latest developments in apparatus and applications of these processes. For various reasons the possibilities of these processes have not been taken advantage of. They are by no means limited to repair work, important as it is, and if employed would revolutionize many practices in manufacturing. The subject well deserves the investigation of those not fully acquainted with it. Representatives of both the makers and users of the apparatus will participate in the discussion.

The subject will be introduced by H. R. Cobleigh, Mem.Am. Soc.M.E., publicity manager of the International Steam Pump Company, New York, in a general paper dealing with the apparatus used in the different processes. The origin and principles of each process, with considerable stress on the flame processes, will be given. This will be followed by two special papers, one on Thermit Welding, by G. E. Pelissier, Assoc.Am.Soc.M.E., superintendent of the Goldschmidt Thermit Company, New York, and one upon Electric Welding, by C. B. Auel, assistant manager of works of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

The discussion will, in the main, be divided as follows:

a Electric resistance welding
b Electric arc welding
c Thermit welding
d Oxy-acetylene welding
e Oxy-hydrogen welding

The fields of application, costs of work, how difficult work may be accomplished and advantages of special features of apparatus will be taken up under each of these divisions. The speakers will not be limited to these particular phases but it is hoped that information along these lines may be brought out. Among those who are ex-

pected to participate are W. R. Noxon, of the Davis-Bournonville Company; Nelson Goodyear, of Nelson Goodyear, Inc.; G. E. Kershaw, Linde Air Products Company; W. H. Levin, of the International Oxygen Company; Henry Cave, of the Autogenous Welding Equipment Company, B. Morgan, Newport, R. I.; and L. P. Alford, Mem.Am.Soc.M.E., editor-in-chief of The American Machinist, New York.

The papers and many of the discussions will be illustrated by lantern slides and it is expected that one process will be shown with moving pictures.

BOSTON MEETING, NOVEMBER 15

A meeting of the members of the Society, the American Institute of Electrical Engineers and the Boston Society of Civil Engineers coöperating, will be held in Boston, on November 15 in the rooms of the Boston Society of Civil Engineers. A paper on Some Refractory Substitutes for Wood, by Charles L. Norton, Mem.Am.Soc.M.E., associate professor of physics of the Massachusetts Institute of Technology, will be presented.

NEW HAVEN MEETING, NOVEMBER 15

The Society will hold a meeting in New Haven in the Mason Laboratory of Mechanical Engineering, on November 15, commencing at 3 p.m., with afternoon and evening sessions. E. S. Cooley, of the Connecticut Company, chairman of the Committee on Meetings of the Society in New Haven, will act as chairman of the afternoon session, when the Cost of Power will be the topic considered. The subject will be introduced by several papers describing plants now in operation in New Haven and vicinity, using power from steam engines, steam turbines, gas and oil engines. At the close of the session the new Mason Laboratory will be open for inspection.

Dinner will be served in the Yale Dining Club at 6 p. m. and the meeting will be resumed at 8 p.m., Lester P. Breckenridge, professor of mechanical engineering of the Sheffield Scientific School, presiding. Col. E. D. Meier, President of the Society, will make an informal address, and an illustrated lecture will be delivered by Chas. F. Scott, Past-President A.I.E.E. and Mem.Am.Soc.M.E., professor of electrica engineering of the Sheffield Scientific School, upon the Hartford Electric Light Company, its Power Plant, Distribution System, and Public Service.

REPORTS OF MEETINGS

NEW YORK MEETING, OCTOBER 9

The monthly meeting of the Society in New York, held in the Engineering Societies Building on October 9, had for the topic of the evening Reinforced Concrete Construction. A paper on Factory Construction and Arrangement was presented by L. P. Alford, Mem. Am.Soc. M.E., editor-in-chief of The American Machinist, and H. C. Farrell, Mem.Am.Soc.M.E., mechanical engineer of the United Shoe Machinery Company, Beverly, Mass., in which the latter company's plant was described. This factory was one of the first to be constructed entirely of reinforced concrete and is an example of its most extensive use for machine-shop purposes.

The discussion centered particularly about the phases of factory arrangement, covering the different methods of arranging machinery for manufacturing; artificial shop lighting, dealing with the advantages of diffused illumination versus individual lights at each machine, and the best types of lamps for each; factory floors, giving the relative advantages of concrete, composition and wood. Those who participated either orally or by means of written contributions were: Alexander Taylor, Mem.Am.Soc.M.E., manager of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; L. D. Burlingame, Mem.Am.Soc.M.E., chief draftsman for the Brown & Sharpe Manufacturing Company, Providence, R. I.; G. H. Stickney, General Electric Company, Schenectady, N. Y.; H. M. Lambourn, superintendent of power plant, Yale & Towne Manufacturing Company, Stamford, Conn.; Henry Hess, Mem.Am.Soc.M.E., president Hess-Bright Manufacturing Company; Gilbert Arnold, Stamford, Conn.; George Parsons; L. C. Wason, president of the Aberthaw Construction Company, Boston, Mass.; and F. A. Waldron, Mem.Am.Soc.M.E., industrial engineer, New York.

The paper and many of the discussions were illustrated by lantern slides, some of them in color.

SAN FRANCISCO MEETING, OCTOBER 17

The members of the Society in San Francisco held a dinner at the Fairmont Hotel, San Francisco, on October 17, to meet Col. E. D.

Meier, President of the Society. A. M. Hunt, chairman of the Committee on Meetings of the Society in San Francisco, presided. Society matters were discussed and George W. Dickie, Edward C. Jones and T. W. Ransom were appointed a committee to confer with the representatives of other engineering organizations with regard to the engineering congress projected for 1915.

The next meeting of the Society for the presentation of professional papers and discussion will probably be held in December.

BOSTON MEETING, OCTOBER 18

The Society coöperated with the American Institute of Electrical Engineers and the Boston Society of Civil Engineers in a meeting held in Boston on October 18, under the auspices of the last organization. The paper of the evening, Power System of the Pacific Mills: Methods, Rules and Cost of Operation, by F. A. Wallace, Assoc.Am.Soc.M.E., master mechanic of the Pacific Mills, Lawrence, Mass., was presented by Mr. Robinson, a member of his staff, and was illustrated by lantern slides.

The Pacific Mills Corporation operates several properties, the largest of which is the group of mills and works on the north side of the Merrimac River at Lawrence, Mass., motive power for which has in the past been obtained from a variety of steam engines supplemented by waterwheels. Recently a power house with turbo-generators, concrete coal pocket, etc., has been provided, and an electric transmission system extending throughout the property. The paper included a very full description of the plant, transmission system and motor drives, as well as of the methods and organization for operation and inspection, and considerable information as to costs. An interesting incident was the reference to a high-pressure high-speed steam engine, built in 1847, to take steam at 30-lb. gage, and running 30 r.p.m., which in its later years of service has been run on exhaust steam from other sources.

The paper was followed by an extended discussion, participated in by C. R. Manning, Mem.Am.Soc.M.E., superintendent of the Amoskeag Manufacturing Company, Manchester, N. H.; A. G. Hosmer, Mem.Am.Soc.M.E., mechanical superintendent of the Lancaster Mills, Clinton, Mass.; Chas. T. Main, Mem.Am.Soc.M.E., Boston, Mass.; W. L. Puffer, Mem.A.I.E.E., Boston, Mass.; R. A. Fessenden, Mem.A.I.E.E., Boston, Mass.; G. A. Burnham, Assoc.A.I.E.E., assistant engineer, Condit Electric Manufacturing Company, Bos-

ton, Mass.; F. M. Gunby, member Boston Society of Civil Engineers, with Chas. T. Main, Boston, Mass.; and others.

PHILADELPHIA MEETING, OCTOBER 18

A meeting of the Society in coöperation with the Franklin Institute was held in Philadelphia on October 18, in the hall of the Institute. The Practical Application of Scientific Management to Railway Operation was presented in a paper by Wilson E. Symons, consulting engineer, Chicago, Ill. Mr. Symons combated the theory that by scientific management in the operation of railways a saving of $1,000,000 a day could be effected, and said practical railroad men who know more about the economic operation of railroads than theorists, had already reduced maintenance and operating expenses to a minimum. The paper contained many statistics and took up in detail a consideration of employees and compensation, operating revenues and expenditures, division of expenditures and balance sheet, efficiency, staff officers, efficiency engineers, the question of over-expenditure on oil, all of which, the author believed, gave evidence for a decision against the adoption of the plan.

Railroad experts as well as men eminent in scientific management were present and the paper was thoroughly discussed in the open meeting which followed. Among the discussors were Webb C. Ball, chief time inspector for the New York Central Lines, Cleveland, Ohio; F. H. Clark, Mem.Am.Soc.M.E., general superintendent of motive power, Baltimore & Ohio Railway, Baltimore, Md.; A. L. Conrad, assistant general auditor for the Atcheson, Topeka & Santa Fé Railway; Charles Day, Mem.Am.Soc.M.E., of Dodge, Day & Zimmerman, Philadelphia; Harrington Emerson, Mem.Am.Soc.M.E., and Frank B. Gilbreth, Mem.Am.Soc.M.E., New York City, both noted exponents of scientific management; George R. Henderson, Mem.Am.Soc.M.E., mechanical engineer for the Baldwin Locomotive Works, Philadelphia; B. B. Milner, mechanical engineer, Pennsylvania Railroad, Wilmington, Del.; Jas. Shirley Eaton, New York; Walter V. Turner, chief engineer of the Westinghouse Air Brake Company, Pittsburgh, Pa., and S. M. Vauclain, Mem.Am.Soc.M.E., superintendent of the Baldwin Locomotive Works, Philadelphia. Mr. Emerson who is the author of the statement that $1,000,000 could be saved daily by the railroads under a system of scientific management, declared that since making that statement he had increased the amount to $2,000,000. He cited figures to show how one railroad had decreased operating expenses and increased its efficiency since adoption of the plan.

STUDENT BRANCHES

LELAND STANFORD JR. UNIVERSITY

On October 4, the Stanford Mechanical Engineering Association held its opening meeting of the year, on which occasion Prof. W. F. Durand gave an interesting and instructive talk on the Los Angeles Aqueduct. This was followed by an open discussion by the members present.

STATE UNIVERSITY OF KENTUCKY

At the first meeting of the year of the State University of Kentucky Student Branch, October 6, William Gibson delivered an address on the Industrial Efficiency and the Attitude of Labor Regarding It. Frederick P. Anderson, professor of mechanical engineering at the University was elected honorary chairman.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

The Mechanical Engineering Society of the Massachusetts Institute of Technology held a dinner on October 19, at which Fred R. Low, Prof. J. C. Riley and E. F. Miller, the new head of the mechanical engineering department, were among the speakers. After the dinner J. A. Noyes outlined the Society's plans for the coming year, which are to include excursions, and lectures by professional men of wide experience and reputation, as well as by members of the senior class.

STEVENS INSTITUTE OF TECHNOLOGY

The first regular meeting of the Stevens Engineering Society was held on October 12, for the election of new members and the discussion of the year's activities. Seventy students were admitted, making the total active membership 132.

The following lectures are scheduled to be delivered before the society during the coming year: October 19, Calvin W. Rice, Secretary of the Society, will extend the greeting of The American Society of Mechanical Engineers, and Charles Whiting Baker will speak on a subject to be announced; November 9, James Hartness, Some Non-

Technical Phases of Machine Design; December 7, Arthur H. Elliott, The Comparative Economics of Coal Gas and Water Gas; December 14, William D. Ennis, Vapor for Heat Engines; January 11, Charles Kirchhoff, Factors in the Development of the Iron Industry; February 8, Charles N. Chadwick, The Catskill Water Supply; February 15, Thomas Travis, The Criminal from the Scientific Standpoint; February 29, Col. E. D. Meier, Modern Boiler Practice; March 14, Worcester R. Warner, What are the Astronomers Doing; April 18, Charles P. Steinmetz, Phenomena Beyond the Elastic Limit, with Special Reference to Electrical Effects.

UNIVERSITY OF CINCINNATI

The University of Cincinnati Student Section held its regular monthly meeting, October 12, at which Augustus Davis, of the Ohio Welding & Manufacturing Company, lectured on the Oxy-Acetylene Process of Welding & Cutting Metals. His demonstrations were practical and showed the engineering possibilities of the process.

UNIVERSITY OF MISSOURI

At the meeting of the Student Section of the Society at the University of Missouri held October 2, the following officers were elected for the first semester: G. D. Mitchell, president; J. H. Pound, secretary-treasurer; P. A. Tanner, corresponding secretary; and H. S. Philbrick, A. C. Edwards, F. J. King, governing committee.

Prof. H. W. Hibbard spoke on the value of The Journal, and A. J. Hecker presented a paper on Troublesome Questions in Brake Design, which was further discussed by Prof. E. A. Fessenden.

On October 16, Professor Hibbard and C. A. Olson spoke on Power Forging and a general discussion of power hammers, rolls and presses followed.

YALE UNIVERSITY

On October 10, the Yale Mechanical Engineers Club held a most successful meeting at which 21 new members were enrolled. Prof. L. P. Breckenridge made a short address in which he set forth the advantages to be derived from a student branch, and subsequently by joining The American Society of Mechanical Engineers.

NECROLOGY

HENRY A. FERGUSSON

Henry A. Fergusson was born in Philadelphia, Pa., December 1869, and received his technical training at the Spring Garden Polytechnic Institute and at Cornell University. In September 1887, he began an apprenticeship at the Baldwin Locomotive Works, Philadelphia, and from 1888 to 1902 was employed by the Pennsylvania Railroad Company at Altoona, Pa., holding successively the positions of assistant foreman of car shops; assistant master mechanic at the Meadows shops; assistant road foreman of engineers of the New York division, in sole charge of tonnage, rating and tests of locomotives; and assistant engineer of motive power. He resigned from the company to become assistant superintendent of motive power of the Chicago Great Western Railroad, St. Paul, Minn., and in 1904 entered the employ of J. T. Ryerson & Sons, Chicago, Ill., as engineer. At the time of his death on April 22, 1911, he had been consulting engineer and general manager for The Steel Roof Truss Company, Valley Park, Mo., for several years.

WILLIAM S. McKINNEY

William S. McKinney was born in Troy, N. Y., August 11, 1844. He removed with his parents to Cincinnati, Ohio, in 1861, where his father engaged in the manufacture of hardware in partnership with Miles Greenwood. At the age of twenty, after the sudden death of his father, he assumed entire charge of the factory, continuing to carry on the business until the expiration of the partnership agreement with Mr. Greenwood. He then, together with his brother J. P. McKinney, built a small works for the manufacture of hardware, making a specialty of strap and tee hinges and butts. Recognizing the advantages to be found in Pittsburgh for a business of this character, they removed the works to Allegheny, Pa., and organized the McKinney Manufacturing Company, of which he was president until his death. His engineering work was confined mainly to the designing, building and improving of machinery adapted for the manufacture of heavy hardware. He died at his home in Pittsburgh, August 30, 1911.